

Glycemic control in the women's hospital NICU

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Abstract: Elevated blood glucose concentrations (BG) (Hyperglycaemia) are a common complication of prematurity in extremely low birth weight neonates in the neonatal intensive care unit (NICU), and are associated with increased mortality and morbidity. Insulin therapy allows glucose tolerance and weight gain to be increased. However, insulin therapy is commonly associated with a significant increase in low BG events (hypoglycaemia), which is also associated with adverse outcomes. Controlling BG levels via nutrition restriction reduces infant growth and is thus undesirable. STAR (Stochastic TARgeted) is a model-based glycaemic framework that mitigates the risks of hypoglycaemia through quantification of current insulin sensitivity and future variability. From August 2008 to December 2012 40 patients totaling 61 glycaemic episodes were treated with STAR in the NICU (STAR-NICU). Percentage time in the clinically targeted 4.0-8.0 mmol/L band was 62%, a 14% increase compared to retrospective data and hyperglycaemia (BG>10.0mmol/L) was halved. Overall incidence of severe hypoglycemia (BG<2.6 mmol/L) was slightly increased from 0.4% to 0.7%, and a concomitant increase in the number of patients experiencing severe hypoglycaemia (8 of 62 control episodes in comparison to 1 of 25 retrospective). Results from 5 patient episodes under the new STAR-GRYPHON protocol were significantly better, with 83% of measurements in the targeted band (35% better than retrospective data and 17% better than original STAR NICU protocols), and 0% incidence of BG<4.0 mmol/L. STAR-GRYPHON is expected to maintain this level of tight glycaemic control. Thus, model based control can be safely and effectively used to control BG in extremely premature infants in intensive care.
